

Amendments to the Claims

This listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims:

1. (Currently Amended) A document image processor comprising:

image inputting means for preparing a document image ~~images~~ by reading a paper document; ~~[[,]]~~

region dividing means for dividing the document image into a plurality of regions; ~~[[,]]~~ and

title-region extracting means for calculating first averages as an average of character size for characters in each region divided by the region dividing means, and then extracting title regions from the entire respective regions according to the first averages, a region average character size equivalent to an average size of characters that is calculated per region divided by the region dividing means,

wherein the title-region extracting means further comprises:

means for calculating a second average that is an average of character size for characters within all the regions;

means for comparing the first averages and extracting criteria found by multiplying the second average by extracting parameters, the extracting parameters on a plurality of levels calculated based on a value found by dividing a maximum of the first averages by the second average; and

means for extracting the regions with the first average larger than the extracting criteria, as the title region.

~~compare each region average character size and an extracting criterion respectively; the extracting criterion that is a total average character size multiplied by an extracting parameter; the total average character size calculated as a value equivalent to an average size of all characters included in the entire regions; and extracts as a title regions with the region average character size larger than the extracting criterion.~~

2. (Currently Amended) A document image processor according to claim 1, wherein the title-region extracting means calculates the first averages and the second average ~~the region average character size and the total average character size~~ based on an average height of characters.

3. (Currently Amended) A document image processor according to claim 1, wherein the title-region extracting means calculates the first averages and the second average ~~the region average character size and the total average character size~~ based on an average width of characters.

4. (Currently Amended) A document image processor according to claim 1, wherein the title-region extracting means calculates the first averages and the second average ~~the region average character size and the total average character size~~ based on an average area of characters.

5. (Cancelled)

6. (Currently Amended) A document image processor according to claim 1, wherein the means for extracting the regions as the title region further extracts each level attribute indicating the level corresponding to each extracted title region. ~~title-region extracting means calculates the extracting criterions on a plurality of levels by using the extracting parameters on a plurality of levels and extracts each title region corresponding to each level attribute indicating the level of the extracting.~~

7. (Cancelled)

8. (Currently Amended) A document image processor according to claim 1, wherein the title-region extracting means adopts the ~~trim average~~ trimmed mean method for discarding a specific proportion of the minimum and the maximum values and then computing the means of the remaining values, in order to calculate the first averages and the second average of character size. ~~calculating the total average character size and the region average character size according to characters excluding both characters larger than the specific ratio and characters smaller than the specific ratio.~~

9. (Currently Amended) A document image processor according to claim 1, ~~which~~ further comprising correcting means for correcting character strings of the extracted title regions.

10. (Cancelled)

11. (Currently Amended) A document title extracting method for ~~[[of]]~~ a document image processor comprising:

~~inputting and an image inputting step of~~ preparing a document image ~~images~~ by reading a paper document;

a dividing step of dividing a plurality of regions from [[a]] the document image;

a calculating step of calculating first averages as an average of character size for characters in each region ~~a region average character size equivalent to the average size of characters per region;~~ and

a title-region extracting step of extracting title regions ~~region~~ from the ~~entire~~ respective regions ~~based on the region average character size~~ according to the first averages, and

wherein the calculating step comprises a step for calculating a second average that is an average of character size in all the regions,

the title-region extracting step comprises a step of comparing the first averages and extracting criteria found by multiplying the second average by extracting parameters, the extracting parameters on a plurality of levels calculated based on a value found by dividing a maximum of the first averages by the second average; and

a step of extracting the regions with the first average more than the extracting criteria, as the title region.

~~in which the step of calculating comprises calculating a total average character size equivalent to the average size of characters in the entire regions;~~

~~and further comprising comparing the region average character size and a extracting criterion that is the total average character size multiplied by an extracting parameter; and~~

~~in which the step of extracting title region comprises extracting as a title region regions with the region average character size larger than the extracting criterion.~~

12. (Currently Amended) A document title extracting method for ~~[[of]]~~ a document image processor according to claim 11, in which the ~~step of calculating step~~ comprises a step of calculating the first averages and the second average ~~region average character size and the total average character size~~ based on an average height of characters.

13. (Currently Amended) A document title extracting method for ~~[[of]]~~ a document image processor according to claim 11, in which the ~~step of calculating step~~ comprises a step of calculating the first averages and the second average ~~region average character size and the total average character size~~ based on an average width of characters.

14. (Currently Amended) A document title extracting method for ~~[[of]]~~ a document image processor according to claim 11, in which the ~~step of calculating step~~ comprises a step of calculating the first averages and the second average ~~region average character size and the total average character size~~ based on an average area of characters.

15. (Cancelled)

16. (Currently Amended) A document title extracting method for a document image processor according to claim 11 ~~claim 14~~, in which the step of extracting the regions as the title region further extracts each level attribute indicating the level corresponding to each

~~extracted title region. step of extracting titles comprises calculating the extracting~~
~~criteria on a plurality of levels by using the extracting parameters on a plurality of~~
~~levels and extracting each title region corresponding to each level attribute indicating~~
~~the level of the extracting.~~

17. (Cancelled)

18. (Currently Amended) A document title extracting method for ~~[[of]]~~ a document image processor according to claim 11, in which the ~~step of extracting title~~ title-region extracting step comprises a step of calculating the first averages and the second average ~~total average~~ ~~character size and the region average character size~~ according to the ~~trim average~~ trimmed mean method for discarding a specific proportion of the minimum and the maximum values and then computing the means of the remaining values. ~~that calculates~~ ~~the average of characters excluding both the characters larger than the specific ratio and~~ ~~the characters smaller than the specific ratio.~~

19. (Original) A document title extracting method of a document image processor according to claim 11, further comprising the step of:

correcting character strings of the extracted title regions.

20. (Cancelled)

21. (Currently Amended) A ~~recording~~ computer readable medium storing a program for performing the steps of ~~for recording programs comprising:~~

dividing a document ~~image~~ images prepared by reading a paper document into a plurality of regions;

calculating first averages as an average of character size for characters within each region and a second average that is an average of character size in all the regions;

comparing the first averages and extracting criteria found by multiplying the second average by extracting parameters, the extracting parameters on a plurality of levels calculated based on a value found by dividing a maximum of the first averages by the second average; and

extracting the regions with the first average more than the extracting criteria, as the title region.

~~calculating per region a region average character size equivalent to an average size of characters in a region and a total average character size equivalent to an average size of characters in the entire regions;~~

~~comparing each region average character size and extracting criterion that is the total average character size multiplied by the extracting parameter; and~~

~~extracting regions with the region average character size larger than the extracting criterion as a title region.~~

22 - 29. (Cancelled)

30. (New) A document image processor comprising:

image inputting means for preparing a document image by reading a paper;
region dividing means for dividing the document image into a plurality of regions; and
title-region extracting means for calculating first averages as an average of
character size for characters within each region divided by the region dividing means,
and then extracting title regions from the respective regions according to the first averages,
and

wherein the title-region extracting means further comprises:

means for calculating a second average that is an average value of character size for
characters within all the regions;

means for comparing the first averages and extracting criteria found by
multiplying the second average by extracting parameters; and

means for extracting the regions with the first average more than the extracting
criteria, as the title region,

wherein the first averages and the second average of character size are calculated based
on characters remaining after discarding a specific proportion of the minimum and the
maximum values of the character size.

31. (New) A document image processor according to claim 30, wherein the title-region
extracting means calculates the first averages and the second average based on an average
height of characters.

32. (New) A document image processor according to claim 30, wherein the title-region extracting means calculates the first averages and the second average based on an average width of characters.

33. (New) A document image processor according to claim 30, wherein the title-region extracting means calculates the first averages and the second average based on an average area of characters.

34. (New) A document image processor according to claim 30, further comprising a correcting means for correcting character strings of the extracted title regions.

35. (New) A document title extracting method for a document image processor comprising:

- an image inputting step of preparing a document image by reading a paper;
- a dividing step of dividing a plurality of regions from the document image;
- a calculating step of calculating first averages as an average of character size for characters within each region; and

- a title-region extracting step of extracting title regions from the respective regions according to the first averages, and

- wherein the calculating step comprise a step for calculating a second average that is an average of character size in all the regions,

- the title-region extracting step comprises a step of comparing the first averages and extracting criteria found by multiplying the second average by extracting

parameters, the extracting parameters on a plurality of levels calculated based on a value found by dividing a maximum of the first averages by the second average; and a step of extracting the regions with the first average larger than the extracting criteria, as the title region, and

the first averages and the second average are calculated according to the trimmed mean method for discarding a specific proportion of the minimum and the maximum values and then computing the means of the remaining values.

36. (New) A document title extracting method for a document image processor according to claim 35, in which the calculating step comprises a step of calculating the first averages and the second average based on an average height of characters.

37. (New) A document title extracting method for a document image processor according to claim 35, in which the calculating step comprises a step of calculating the first averages and the second average based on an average width of characters.

38. (New) A document title extracting method for a document image processor according to claim 35, in which the calculating step comprises a step of calculating the first averages and the second average based on an average area of characters.

39. (New) A document title extracting method of a document image processor according to claim 35, further comprising the step of:

correcting character strings of the extracted title regions.

40. (New) A document title extracting method of a document image processor according to claim 35, wherein the characters of which character size are lower than the specific portion are punctuation marks.

41. (New) A document image processor according to claim 8, wherein the characters of which character size are lower than the specific portion are punctuation marks.